Audit memory and sustainable audit success of
tax auditors in Thailand

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Keywords
Audit Memory, Audit Planning Quality, Audit Judgment Effectiveness, Audit Performance, Sustainable Audit Success

Abstract
The purpose of this research was to test the amount of audit memory and sustainable audit success via the mediating influences which include audit planning quality, audit judgment effectiveness and audit performance. Data were collected from 124 tax auditors in Thailand by using a questionnaire as a research instrument. The statistic used for data analysis was multiple regressions. The research found that audit memory also affects audit planning quality and audit judgment effectiveness. Furthermore, there are effects on audit performance and sustainable audit success, while audit environmental change does not show moderating effect. Potential discussion with the results of the study is implemented. Thus, theoretical and managerial contributions and suggestions are also provided for future research.

1. Introduction
Nowadays it is widely accepted that auditors play an important role in detecting and preventing fraud. Since the auditors’ response for evaluating the reliability and accuracy of organization’s financial statement, a specific knowledge and skills are mostly required in order to create an effective audit report. Auditor memory is one of an important role in the quality since memory error or overconfident in incorrect memory will lead to inaccurate audit report. The auditors need to be able to recall previous encounter evidence and information to conduct a quality audit (Moeckel and Plumlee, 1989; Frederick, 1991). According to professional auditing standards emphasize the role of auditor judgment in considering of sufficient evidential matter that has been obtained to support the assertions made in the financial statements under examination (AICPA 1992, AU p. 326).

In the past, audit information was stored permanently in long-term memory, which will be used for audit planning and audit judgment. The long-term memory brings about great audit performance because of reducing cost and time of audit operation. Auditor can use audit memory to assist audit profession and sustainability audit success (Barney, 2001). This study applies the concept of sustainability to audit success. The sustainable audit success is fundamental for the auditor to provide a professional outcome for clients’ satisfaction and needs sustainable audit success from that profession and have an effect on audit performance. The rapid growth of business in Thailand, but limit number of CPA, thus tax auditors play a crucial role for audit and report of small business that were the audit standards of the CPA (Tax Association of Thailand, 2015).

The research questions of this paper are: 1) How does audit memory affect audit planning quality and audit judgment effectiveness? 2) How do audit planning quality and audit judgment effectiveness affect audit performance? 3) How does audit performance affect sustainable audit success? And 4) How does audit environmental change moderate the relationships between audit performance and sustainable audit success?

In addition, three purposes of audit memory comprise 1) To investigate the relationships among dimension of audit memory, audit planning quality and audit judgment effectiveness. 2) To investigate the relationships among audit planning quality, audit judgment effectiveness and audit performance. 3) To investigate the relationships among audit performance and sustainable audit success.
2. Literature Review

This research aims to examine the relationships between audit memory and sustainable audit success. Audit memory is an independent variable of this research that includes two dimensions: episodic memory and semantic memory. Sustainable audit success is a dependent variable through its impact on three mediators—audit planning quality, audit judgment effectiveness, and audit performance. In addition, the research investigates audit environmental change as a moderator of the relationships. Therefore, the conceptual model presents the relations between audit memory and sustainable audit success in Figure 1.

**Audit Memory**

Audit memory is defined as audit task information that stored in memory (Johnson, 1994). Many researchers attempt to classify all memory processes within two broad categories. Tulving (1983) indicated that there are two categories of memory, semantic and episodic memory. However, the aspects of episodic memory had been widely ignored (Loftus et al., 1987). Therefore, the audit memory in this paper consists of episodic memory and semantic memory, which both are considered as long-term memory and take variety forms.

**Episodic Memory**

Episodic memory is specific experiences with various auditing tasks (Johnson, 1994). Episodic processing organizes information in a temporal sequence focusing on episodes of related events. A previous research suggests that executives can encode new information either through episodic memory or semantic memory processes for planning and time saving of tasks and activity effectiveness (Tulving, 1983). According to previous studies of auditor memory performance have suggested that information retrieval errors, based on such factor as experience of audit or episodic memory (Moeckel, 1990). Moreover, memory and audit that used how confident in the accuracy of episodic memory which has relationship with audit judgment effectiveness (Moeckel and Plumlee, 1989). Hence, the hypothesis are proposed as below:

**Hypothesis 1:** Episodic memory will have a positive influence on (a) audit planning quality (b) audit judgment effectiveness.

**Semantic Memory**

Semantic memory is a general knowledge of global auditing concepts (Johnson, 1994). It is a mental thesaurus, organized knowledge a person possesses about the relations among them, and about rules, formulas, and algorithms for the manipulation of these symbols, concepts, and relate. Semantic processing organizes information around categories of attributes by focusing on taxonomies of common features. Theories of naturalistic decision making suggest that people tend to make decisions by organizing cues around events that they either
recognize from past experience of construct through experience-based analogies (Klein, 1998). Hence, the hypothesis are proposed as below:

**Hypothesis 2: Semantic memory will have a positive influence on (a) audit planning quality (b) audit judgment effectiveness.**

**Audit Planning Quality**

Audit planning quality is defined as auditing process of auditor to operate assessment risk of clients’ business, allocation of audit resource and developed an overall audit plan for higher audit approaches to reduce costs and time in the audit procedure (Arens et al., 2005). Auditor’s responsibilities in the auditing process comprise audit planning, consideration of fraud and reporting on clients (Arens et al., 2005). The reduction in budgeted hours and planned tests may reduce audit cost and improve audit efficiency by possibly eliminating over-auditing and budgetary slack (Bierstaker and Wright, 2001). Audit planning quality has most significant in part of auditing. It can improve audit efficiency and effectiveness (Arel, 2010). Thus, if auditor with higher the audit planning, quality provides an auditors’ report accuracy and credibility. That will enhance user acceptance of user that impact audit performance. Hence, the hypothesis is proposed as below:

**Hypothesis 3: Audit planning quality will have a positive influence on audit performance.**

**Audit Judgment Effectiveness**

Audit judgment effectiveness refers to the judgment of auditor achieving audit’s objectives by gathering sufficient information and appropriate audit evidence in order to obtain reasonable opinions regarding the financial statements in compliance with audit standards to make a decision (Fleak and Wilson, 1994). Obaidat (2007) found that financial statement provides an increase in confidence that the audit practice of being conducted in audit effectiveness and information usefulness manners. Auditors may attempt to enhance audit efficiency while maintaining audit effectiveness, by decreasing the effort to less effective audit procedures and low risk audit (Houston, 1999). Previous research of effective audit judgment has the important positive impact on audit performance. Audit performance have the important positive impact on audit survival (Uachanachit and Ussahawanitchakit, 2012). Therefore, audit judgment effectiveness can improve audit effectiveness and attempt to enhance audit performance so as to influence survival audit success. Hence, the hypothesis is proposed as below:

**Hypothesis 4: Audit judgment effectiveness will have a positive influence on audit performance.**

**Audit Performance**

Audit performance is an issue that interest after corporate scandals that have affected reliability and credibility of auditing. The quality of the auditing depends on auditing standard and auditor to be expected in outcome. (Lin and Hwang, 2010). Thus, audit performance refers to an outcome from audit evidence and audit opinion of the auditor that has been performed in accordance with GASS. Furthermore, firm’s own requirements using specialized of auditing to increase effectiveness and efficiency (Bamber and Ramsay, 2000). According to Uachanachit and Ussahawanitchakit (2012) found that effective audit judgment and audit report quality have the important positive impact on audit performance and including audit performance has the positive impact audit survival in long time. Hence, the hypothesis is proposed as below:

**Hypothesis 5: Audit performance will have a positive influence on sustainable audit success.**

**Sustainable Audit Success**

Sustainable audit success refers to attainment of auditor that enables to achieve objectives or goals for the long time by consider from client acceptance, client satisfaction and increasing new clients and sustaining of previous clients. (Craswell et al., 1995) Previous researches indicate audit planning quality that increases will help auditors provide greater audit report value or audit performance leading to sustainable audit success (Khampichit and Ussahawanichakit, 2011). Indeed, auditors believe that enhancing audit quality is the only sustainable way to achieve the audit goal (Peecher et al., 2007) found that, the sustainable audit success is a continuous audit operation with target clients that gains from audit quality through audit performance (Chang el et al., 2008).
Auditing Environmental Change

Auditing environmental change refers to auditing relate to audit practice and regulation that influence auditor roles by changing of audit standard, accounting standard, technology change and improves audit assurance services (Jayalakshmy et al., 2005). Auditor attempts to develop their professional skills when face situation audit environment change. Audit environment change such as new technology, process of financial statement attestation, changes to audit methods and methodologies, including new accounting standard and new audit standard (Barretta et al., 2005). According to Struweg and Meintjies (2008) found that audit standards are fundamental that necessary of auditing. Audit change professional standard require for auditor bring service to client and influencing auditor’s professionalism. Therefore, auditing environmental change can be influenced sustainable audit success. Hence, the hypotheses are proposed as below:

Hypothesis 6: Auditing environmental change will positively moderate the relationships between audit performance and sustainable audit success.

3. Research Method
3.1 Data Collection

A questionnaire mail survey was used for data collection. Questionnaires will be conducted by study with key informant as Tax Auditors (TA) in Thailand, which were chosen from the database of The Revenue Department of Tax Auditor (www.taxaudit.rd.go.th). The effective 124 questionnaires from Tax Auditors were usable. As estimate of non-response bias was calculated by comparing the result of early and late respondents. By t-test statistics in term gender, level of education, experience, and tenure. The result showed no statistic significant differences, indicating that non-response bias did not appear to be problem in this research (Armstrong and Overton, 1977).

3.2 Variables measurement

The questionnaire design was developed from review literatures, reviewed by academics that improved and selected the scale of measures. The questionnaire was constructed covering contents according to each variable operationalized for empirical studies. This tool was improved by the pre-test done by experts on academic test for content validity. The tool was improved before distributing samples. To measure each construct in the conceptual model, all variables are gained from the survey and all items of questions use five-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). Key informants were self-reported in all constructs. The following measures were constructed for the study of dependent, independent, consequence, moderator and control variables.

Dependent Variable

Sustainable audit survival is measured by continued clients, created new clients and served other services which the auditors must present fairly the statement in accordance with GAAP that enables audit to achieve objectives or goals for the long-time. This construct is developed as a new scale from definition and literature including five item scales.

Independent Variable

Audit memory is measured by information about audit task stored in memory. The memory representations of both specific experiences with various auditing tasks (episodic memory) and general knowledge of global auditing concepts (semantic memory), such as the meaning of professional auditing standards, the elements of a strong internal control structure, or the relationships among financial statement assertions and audit objectives. This construct is developed as a new scale from definition and literature including ten item scales.

Mediating Variables

Audit Judgment Effectiveness

Audit judgment effectiveness is measured by the judgment of auditor that achieving audit’s objective by gathering sufficient information and appropriate audit evidence in order to obtain reasonable opinions regarding the financial statements in compliance with audit standards to make decision. This construct is developed as a new scale from definition and literature including five item scales.
Audit Planning Quality
Audit planning quality is measured by the auditing process of auditor to operate assessment risk of clients’ business, allocation of audit resource and developed overall audit plan for higher audit approaches to reduce costs and time in the audit procedure. Auditor’s responsibilities in the auditing process comprise audit planning, consideration of fraud and reporting on clients. This construct is developed as a new scale from definition and literature including four item scales.

Audit Performance
Audit performance is measured by outcome from audit evidence and audit opinion of auditors that has been performed in accordance with GASS. Firm’s own requirements using specialized of auditing to increase effectiveness and efficiency. This construct is developed as a new scale from definition and literature including four item scales.

Moderating Variables
Auditing environmental change is measured by auditing relates to audit practice and regulation that influence auditor roles by changing of auditing standard, accounting standard, technology change and improves audit assurance services. This construct is developed as a new scale from definition and literature including four item scales.

Control Variables
Two control variables are included gender and age. Previous research indicate that gender of auditor affects the relationships among audit planning quality and audit judgment effectiveness (Keller et al., 2007). Accordingly, previous research predicted that gender affects the relationships between audit performance and audit judgment of auditor. Male auditors have reason to solve the problem more than female auditor, which skill and knowledge are reasons require preparation in audit planning. (Dalton et al., 1997). In this research, gender is represented by a dummy variable including 1 is male and 2 is female.

Age has an effect on audit competencies and audit performance of auditors. Previous research on Fisher (2001) use age is controlled variable. In this research, age is measured by dummy variable, including 0 = Less than 35 years older or equal 35 years older, and 1 = more than 35 years older.

3.3 Validity and reliability
Table 1 presents the results for both factor loadings and Cronbach’s alpha coefficients. Factor analysis was firstly utilized to investigate validity the underlying relationships of a large number of items and to confirmatory factors. All factor loadings are 0.635-0.898 greater than the 0.4 cut-off and are statistically significant (Hair, 2010). The reliability is a stability of measures over a variety of conditions to be measured. Reliability was evaluated by coefficients of Cronbach’s alpha 0.887- 0.969 which are greater than 0.7, (Nunnally et. al., 1994). Therefore, Cronbach’s alpha is deemed to have adequate reliability.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor Loadings</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Episodic Memory (EPM)</td>
<td>0.767 – 0.834</td>
<td>0.969</td>
</tr>
<tr>
<td>Semantic Memory (EPM)</td>
<td>0.635 – 0.805</td>
<td>0.899</td>
</tr>
<tr>
<td>Audit Planning Quality (APQ)</td>
<td>0.841 – 0.898</td>
<td>0.960</td>
</tr>
<tr>
<td>Audit Judgment Effectiveness (AJE)</td>
<td>0.774 – 0.874</td>
<td>0.923</td>
</tr>
<tr>
<td>Audit Performance (AP)</td>
<td>0.817 – 0.895</td>
<td>0.910</td>
</tr>
<tr>
<td>Sustainable Audit Success (SAS)</td>
<td>0.710 – 0.836</td>
<td>0.887</td>
</tr>
<tr>
<td>Audit Environmental Change (ENV)</td>
<td>0.780 – 0.836</td>
<td>0.917</td>
</tr>
</tbody>
</table>

3.4 Statistic Technique
Regression analysis were employed to analyze the relationship between a dependent variable and independent variable. The Ordinary Least Squares (OLS) regression analysis is used to test the hypothesized. From the hypotheses and conceptual models, the following five equation models are proposed:
Equation 1: \[ APQ = \beta_{01} + \beta_{1}EPM + \beta_{2}SEM + \beta_{3}GENDER + \beta_{4}AGE + \varepsilon_{1} \]
Equation 2: \[ AJE = \beta_{02} + \beta_{5}EPM + \beta_{6}SEM + \beta_{7}GENDER + \beta_{8}AGE + \varepsilon_{2} \]
Equation 3: \[ AP = \beta_{03} + \beta_{9}APQ + \beta_{10}AJE + \beta_{11}GENDER + \beta_{12}AGE + \varepsilon_{3} \]
Equation 4: \[ SAS = \beta_{04} + \beta_{13}AP + \beta_{14}GENDER + \beta_{15}AGE + \varepsilon_{4} \]
Equation 5: \[ SAS = \beta_{05} + \beta_{16}AP + \beta_{17}ENV + \beta_{18}AP\times ENV + \beta_{19}GENDER + \beta_{20}AGE + \varepsilon_{5} \]

Where, EPM is Episodic Memory, SEM is Semantic Memory, APQ is Audit Planning Quality, AJE is Audit Judgment Effectiveness, AP is Audit Performance, SAS is Sustainable Audit Success, ENV is Audit Environmental Change, \( \beta_i \) is regression coefficients, \( \varepsilon_i \) is the error term.

### 4. Result and Discussion

Table 2 presents the descriptive statistics and correlation matrix for all the variables. The high correlation value between independent variables more than 0.6 may be a multicollinearity problem (Hair et al., 2010). With regard to potential problems related to multicollinearity, variance inflation factors (VIFs) are used to provide information on the extent to which non-orthogonality among independent variables inflates standard error. The VIFs for the explanatory variables were small in all models which were ranged from 1.0 to 3.8 well below the cut-off value 10 as recommended by Hair et al., (2010) meaning that the independent variables are not correlated with each other. Thus, there are no substantial multicollinearity problems encountered in this study.

<table>
<thead>
<tr>
<th></th>
<th>EPM</th>
<th>SEM</th>
<th>APQ</th>
<th>AJE</th>
<th>AP</th>
<th>SAS</th>
<th>ENV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.941</td>
<td>3.539</td>
<td>3.512</td>
<td>4.025</td>
<td>3.796</td>
<td>3.400</td>
<td>3.938</td>
</tr>
<tr>
<td>S.D.</td>
<td>0.595</td>
<td>0.765</td>
<td>0.737</td>
<td>0.712</td>
<td>0.743</td>
<td>0.692</td>
<td>0.614</td>
</tr>
<tr>
<td>SEM</td>
<td>.734**</td>
<td>.763**</td>
<td>.737**</td>
<td>.712**</td>
<td>.743**</td>
<td>.692**</td>
<td>.614**</td>
</tr>
<tr>
<td>APQ</td>
<td>.691**</td>
<td>.803**</td>
<td>.818**</td>
<td>.796**</td>
<td>.792**</td>
<td>.667**</td>
<td>.599**</td>
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<tr>
<td>AJE</td>
<td>.695**</td>
<td>.754**</td>
<td>.818**</td>
<td>.796**</td>
<td>.792**</td>
<td>.667**</td>
<td>.599**</td>
</tr>
<tr>
<td>AP</td>
<td>.642**</td>
<td>.749**</td>
<td>.796**</td>
<td>.792**</td>
<td>.661**</td>
<td>.562**</td>
<td>.599**</td>
</tr>
<tr>
<td>SAS</td>
<td>.627**</td>
<td>.624**</td>
<td>.732**</td>
<td>.721**</td>
<td>.667**</td>
<td>.562**</td>
<td>.599**</td>
</tr>
<tr>
<td>ENV</td>
<td>.609**</td>
<td>.592**</td>
<td>.617**</td>
<td>.661**</td>
<td>.562**</td>
<td>.599**</td>
<td>.599**</td>
</tr>
</tbody>
</table>

**p < 0.05

Table 2: Descriptive statistics and correlation matrix

Table 3 shows model 1 and 2 on, the findings show that episodic memory has strongly significant effect on audit planning quality (b= 0.508, p <0.01) and strongly significant effect on audit judgment effectiveness (b= 0.536, p <0.01). Consistent manager can encode new information either through episodic or semantic memory processes for effective planning and time saving of tasks and activity (Tulving, 1983). Thus, hypothesis 1a and 1b are strongly supported.

For a semantic memory that is similarly episodic memory has strongly significant effect on audit planning quality (b= 0.640, p <0.05) and strongly significant effect on audit judgment effectiveness (b= 0.573, p <0.05). Auditors tent to make decisions and judgment by organizing cues around events that they either recognize from the past to effectiveness decision (Klein, 1998). Thus, hypothesis 2a and 2b are strongly supported.
Table 4 shows model 3, the findings indicate that the relationships between audit planning, quality and audit performance (b=0.432, p < 0.01) and the relationships between audit judgment effectiveness and audit performance (b=0.449, p < 0.01) are strongly significant. Audit planning quality helps the auditor reduce costs and chargeable time and full scope to test in the audit procedure enhancing audit performance (Arens et al., 2005). Similarly audit judgment effectiveness, auditor’s understanding of a business context well, a given auditing task is performed. According to Houston (1999) found that auditors may attempt to enhance audit efficiency while maintaining audit effectiveness, by increasing effort to more effective audit procedures and low risk audit. Thus, hypothesis 3 and 4 are strongly supported.

Table 3: Results of OLS regression analysis

Table 4 shows model 3, the findings indicate that the relationships between audit planning, quality and audit performance (b=0.432, p < 0.01) and the relationships between audit judgment effectiveness and audit performance (b=0.449, p < 0.01) are strongly significant. Audit planning quality helps the auditor reduce costs and chargeable time and full scope to test in the audit procedure enhancing audit performance (Arens et al., 2005). Similarly audit judgment effectiveness, auditor's understanding of a business context well, a given auditing task is performed. According to Houston (1999) found that auditors may attempt to enhance audit efficiency while maintaining audit effectiveness, by increasing effort to more effective audit procedures and low risk audit. Thus, hypothesis 3 and 4 are strongly supported.

Table 4: Results of OLS regression analysis

In model 4 the findings show that audit performance is strongly significant to the relationship of sustainable audit success (b=0.658, p < 0.01). Tax auditor has an opinion and work is best performed in audit activities by using specialization to increase effectiveness and efficiency and long term success in audit, thus, hypothesis 5 are strongly supported.

In model 5 the findings indicate the moderating effect of audit environmental change. Surprisingly, the audit environmental change does not moderate the relationship between audit performance and audit success (b=0.027, p < 0.235) based on these results auditor does not perceive environmental change effect. The result was contradiction to Jayalakshmy el et., (2005) who argued that audit environment change to audit work that influences auditor roles by changing of audit enlargement compliance, statutory audit, and audit standards. Thus, hypothesis 6 are not supported.
5. Contributions
5.1 Theoretical Contribution  
For theoretical contribution, this research provides important expansion on knowledge and relevant literature of auditing memory. Moreover, this research focuses on audit memory dimension that can enhance audit planning quality, audit judgment effectiveness, audit performance. In addition, this work is added audit environmental change as a moderator of the relationship audit performance led to sustainable audit success.

5.2 Managerial Contribution  
This results of the research shows important of audit memory on audit performance and sustainable audit success of tax auditors. Therefore, it shows the important of audit planning quality and audit judgment effectiveness can increase audit performance led to sustainable audit success. The regulator agencies can develop and support in respect to professional audit though audit planning quality. It can enhance audit quality of tax auditors report and reliability of financial reporting.

6. Conclusion  
This research is to test the relationships between audit memory, audit planning quality, audit judgment effectiveness, audit performance and sustainable audit success having audit environmental change as a moderator. Data were collected from 124 tax auditors in Thailand. The result also found audit memory (episodic memory and semantic memory) affects audit planning quality and audit judgment effectiveness and there are effects on audit performance and sustainable audit success, while audit environmental change does not show moderating effect.

7. Limitation and suggestion for future research  
Limitation of this research is a small sample size because timing that used to collect the data is busy season to audit financial statement in Thailand, Thus future research should extend timing for long time period or avoid audit season and extend the relationship of new variables such as audit reputation, audit competency to study.

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